REMARKS/ARGUMENTS

Favorable reconsideration of this application is requested in view of the above amendments and in light of the following remarks and discussion.

Claims 1-7, 9-18, and 20-26 are pending. Claims 8 and 19 are canceled. Claims 1 and 12 are amended. Support for the amendments to Claims 1 and 12 can be found in now-canceled Claims 8 and 19 and in Fig. 1, for example. No new matter is added.

In the outstanding Office Action, Claims 1, 7, 9-12, 18, and 20-26 were rejected under 35 U.S.C. § 103(a) as obvious over Flanigan et al. (U.S. Patent No. 6,081,414, herein "Flanigan") in view of Sundar (U.S. Patent Pub. 2001/0016157, herein "Sundar"), and Sung et al. (U.S. Patent No. 6,347,990, herein "Sung"). Claims 2, 7, 13, and 18 were rejected under 35 U.S.C. § 103(a) as obvious over Flanigan, Sundar, Sung, and Watanabe et al. (U.S. Patent No. 5,625,526, herein "Watanabe"). Claims 3-5 and 14-16 were rejected under 35 U.S.C. § 103(a) as obvious over Flanigan, Sundar, Sung, and Nagasaki (U.S. Patent No. 6,215,643, herein "Nagasaki"). Claims 6, 8, 17, and 19 were rejected under 35 U.S.C. § 103(a) as obvious over Flanigan, Sundar, Sung, Nagasaki, and Paschen (Published Paper Wied. Ann., 37, 69, 1889), herein "Paschen").

Regarding the rejection of Claims 1, 7, 9-12, 18, and 20-26 as obvious over Flanigan, Sundar, and Sung, that rejection is respectfully traversed by the present response.

As amended independent Claim 1 incorporates the features of now-canceled dependent Claim 8, Applicants discuss the rejection of now-canceled dependent Claim 8 in the discussion of amended independent Claim 1.

The invention recited in amended Claim 1 is directed to a method in which the processing chamber is maintained under the vacuum condition during the idle state by **the exhaust system, for example, exhaust system (14), which is provided outside of the processing chamber, e.g., vacuum processing chamber (1)**. Accordingly, the pressure of

the processing chamber is maintained within a range of 13 Pa-40 Pa as recited in amended independent Claim 1 (previously recited in Claim 8).

One benefit of this arrangement is that the number of gas molecules in the gas flow path can be reduced to decrease the charged voltage, thereby preventing the dielectric breakdown of the insulating film of the electrostatic chuck. Moreover, in one example, the electric discharge between the gas flow path (7) and the showerhead (15) as the upper electrode can be reduced (see, paragraphs [0058] to [0060] of the specification).

The outstanding Office Action acknowledges that Flanigan is silent regarding controlling the pressure as discussed above, and relies on Sung for the feature of maintaining higher pressure in the process area than in a transfer area.[1] The outstanding Office Action relies on Paschen for the feature of providing a predetermined pressure in the vacuum processing chamber of 13 Pa-40 Pa.[2]

Applicants respectfully note that Sung describes a processing chamber in which cleaning is performed. At the time of cleaning, the pressure in the processing chamber (131) is approximately the same as or above atmospheric pressure. Sung does not describe that the processing chamber (131) is used for a plasma process, much less that the pressure in the processing chamber (131) is higher than the pressure in the transfer chamber (132) during a period between plasma processes.

Paschen is directly correlated to data regarding the breakdown voltage required to generate a **plasma** over a particular gap for various gas pressures. A person of ordinary skill in the art would not combine the teaching of Paschen, i.e., parameters related to **plasma**, with those of the cleaning process described in Sung in order to provide the pressure range from 13 Pa-40 Pa recited in amended independent Claim 1. Rather, Sung is unrelated to plasma

[1] Outstanding Office Action, page 4.
[2] Outstanding Office Action, page 8.

processing and provides its higher pressure in processing chamber (131) during a cleaning process.

The air flow during the cleaning process in Sung appears to be created merely by flow from a plenum (200) to another plenum (300). Sung also describes an air exhausting device (600) described as a fan in Fig. 6. The air flow in Sung is generally at atmospheric pressure or above. Accordingly, Applicants respectfully submit that the plasma processing pressures described in Paschen would not apply to Sung inasmuch as Sung is completely unrelated to plasma processing and provides air flow merely for ventilation, generally at or above **atmospheric** pressure. Thus, a person of ordinary skill in the art would not have found it obvious, at the time the claimed invention was made, to combine the specific pressures described in Paschen with the process described in Sung.

The Office Action asserts that Sung teaches that the air pressure in the process area is maintained higher than the air pressure in the transfer area during the idle state. As described previously, the recited process area may be interpreted as the plasma processing chamber and the transfer area may be interpreted as the transfer chamber. Since the above-described pressure control is performed for conducting the **cleaning** of the fabrication system, the outstanding Office Action asserts that the pressure control may be performed during the idle state of the fabrication system.

In Sung, since the air pressure in the process chamber is set higher than the air pressure in the transfer chamber, the particle flow from the transfer chamber to the processing chamber can be reduced during the cleaning state (col. 3, fifth paragraph). Referring to Figs. 5 and 6 of Sung, and the related description, the clean air is supplied from the upper plenum (200) to the lower plenum (300) through the working area (110) and the service area (120). In this case, the clean air is sucked by the air-supplying device (500) to be supplied to the process area (processing chamber) (131) and the transfer area (transfer chamber) (132).

Then, the air in the transfer area (132) is exhausted by the air-exhausting device (600) so that the air pressure in the process area (131) is set higher than the air pressure in the transfer area (132).

However, since no vacuum pump is provided under the supply of the clean air, the inside of the total system composed of the upper plenum (200), the lower plenum (300), the working area (110), the service area (120), the process area (131) and the transfer area (132) is pressurized. Moreover, since the process area (131) is open to the transfer area (132), the working area (110) and the service area (120), the air pressure in the process area (131) is not maintained under a vacuum condition.

Since Sung does not teach the maintenance of the transfer area under the vacuum condition, Sung does not create the reduction of the charged voltage and thus does not reduce, the dielectric breakdown of the insulating film of the electrostatic chuck or prevent the electric discharge between the gas flow path and the upper electrode. Moreover, as Sung provides no enclosed gas flow path in the system, Sung does not anticipate the maintenance of the transfer area under the vacuum condition.

Flanigan is directed to an apparatus for improved biasing and retaining a workpiece in a plasma process chamber comprising a pedestal assembly (block) (104) (Figure 2) and an electrostatic chuck (component) (105) in the vacuum processing chamber disposed in contact with the block and made at least partly of an insulative material. The wafer is transferred to/from the chamber from/to a loadlock (Figure 1), and is plasma processed. The vacuum in the chamber is controlled for PVD or other processes. In operation, Flanigan teaches only that the wafer (102) is placed on the support surface (103) of the electrostatic chamber, and then, air is drawn out of the chamber (100) via the vacuum pump (128) to create a low pressure environment (i.e., 1 mTorr to 5 Torr), and then, the reactant gas is introduced into the chamber (100) from one of the remote gas sources (130) and (134) (see col. 7). The

pressure environment in Flanigan is directed at the plasma processing. The pressure environment in the invention recited in amended independent Claim 1 is directed toward the idle state of the plasma processing **between** the one object processing and the subsequent object processing.

Sundar teaches only to deliver the purge gas such as argon (Ar) or nitrogen (N_2) into **the transfer chamber** via the purge gas inlet. In contrast, the invention recited in amended independent Claim 1 is directed at delivering the inert gas such as Ar into the plasma processing chamber, not to the transfer chamber.

Accordingly, Applicants respectfully submit that amended independent Claim 1 patentably distinguishes over any proper combination of Flanigan, Sundar, and Sung for at least the reasons discussed above. Amended independent Claim 12 recites substantially similar features to those discussed above regarding Claim 1 and patentably distinguishes over any proper combination of Flanigan, Sundar, and Sung for at least the same reasons as Claim 1 does. Claims 7, 9-11, 18, and 20-26 each depend from one of Claims 1 and 12 and patentably distinguish over any reasonable combination of Flanigan, Sundar, and Sung for at least the same reasons.

Regarding the rejection of Claims 2, 7, 13, and 18 as obvious over Flanigan, Sundar, Sung, and Watanabe, that rejection is respectfully traversed by the present response. The outstanding Office action relies on Watanabe for the fluorinated refrigerant recited in Claims 2 and 7 and the nitrogen gas recited in Claims 13 and 18. However, Watanabe fails to teach or suggest the specific pressure range recited in amended independent Claim 1 and suffers from the same deficiencies as Flanigan.

Regarding the rejection of Claims 3-5 and 14-15 as obvious over Flanigan, Sundar, Sung, and Nagasaki, that rejection is respectfully traversed by the present response. The outstanding Office Action relies on Nagasaki for the specific volume resistivity recited in

Claims 3 and 14 and the materials recited in Claims 4, 5, and 15. However, Nagasaki fails to describe the specific pressures that occur between processes recited in independent Claims 1 and 12. Accordingly, Nagasaki suffers from the same deficiencies as Flanigan.

The amendments to Claims 1 and 12 raise no new issues inasmuch as they principally incorporate the features of now-canceled dependent Claims 8 and 19 or otherwise place the application in better form for appeal, and Applicants respectfully request that the amendments be entered in accordance with 37 C.F.R. § 1.116.

For the foregoing reasons, it is respectfully submitted that this application is now in condition for allowance. A Notice of Allowance for Claims 1-7, 9-18, and 20-26 is earnestly solicited.

Should Examiner Dahimene deem that any further action is necessary to place this application in even better form for allowance, Examiner Dahimene is encouraged to contact Applicants' undersigned representative at the below-listed telephone number.

Respectfully submitted,

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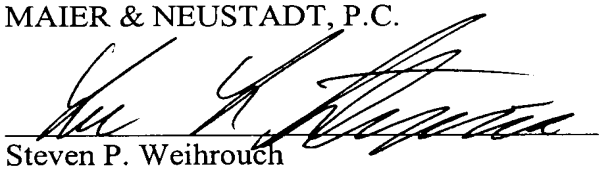

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